unpatentable over Hoffert in view of Munk as applied to Claims 1-2 above, and further in view of US Patent No. 4,022,591 to Staudinger; Claims 14, 16, 18 21-22 & 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffert in view of Munk, and further in view of US Patent No. 6, 883, 443 to Rettig et al (Rettig); Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffert in view of US Patent No. 6, 145, 452 to Heger et al. (Heger); Claims 17 & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffert in view of Munk as applied to claim 16 above, and further in view of Kasin; and Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffert in view of Staudinger. Applicants respectfully traverse the rejections for at least the following reasons.

The Office Action asserts that Hoffert discloses all the features of Claim 1 except for recycled gases being supplied to the combustion reactor or water being injected into the recycled gases to raise the concentration of water in the recycled gases. The Office Action looks to Munk to cure the stated deficiencies of Hoffert, asserting that Munk teaches recycling flue gases to a combustion chamber and water being injected into the recycled gases to raise the concentration of water in the recycled gases and, therefore, it would have been obvious for one of ordinary skill in the art at the time of invention to combine the combustion apparatus of Hoffert with the flue gas humidification/ recirculation of Munk because such a combination would have produced the added benefit of reduced NOx emissions and a more efficient combustion process.

Hoffert teaches a burner for burning solid fuels wherein fuel particles having higher mass are retained for very long periods of time relative to the combustible volatiles (col. 2, lines 18-23). A combustion process taught by Hoffert provides for high

volumetric heat release rates approaching those for liquid and gaseous fuels are provided (col. 3, lines 25-27). The combustion method taught by Hoffert is a pressurized cyclonic combustion method, wherein clean pressurized hot effluent gases are produced that can be expanded in a gas turbine to produce power (e.g., see the Abstract). The burner apparatus is a cylindrical pressurized burner which utilizes helical flow patterns to provide prolonged combustion of the fuel solids and uses an intermediate choke zone and an air quench step to improve combustion and control temperature of the produced effluent gases (col. 1, lines 17-26).

The burner, or primary combustion chamber, operates at a pressure from 3 atm to 20 atm (col. 3, lines 38-43). The burner combustion chamber terminates with a choke opening 20a (Fig. 1) (col. 4, lines 53-54). The position of the choke opening can also be changed to facilitate the passage of ash from the primary combustion chamber (col. 6, lines 56-58). Downstream from the choke, there is the secondary combustion chamber (col. 4, lines 62-63)

The Applicants again note that the technical problem addressed by Hoffert is to provide very high volumetric heat release rates approaching those for liquid and gaseous fluid (col. 3, lines 26-27). As such, the technical problem addressed by Hoffert has nothing to do with the technical problem solved by the present invention, that is, the production at the mouth of the reactor of combustion fumes with a very low content of TOC (of the order of ppm) and volatile ash content. Hoffert does not address TOC. As to fly ash, Hoffert discloses that the fly ashes are removed downhill from the combustor by a cyclone. Therefore, the combustion process of Hoffert produces fly ash, which is specifically avoided by the solution provided by the claimed invention. The combustion

process of Hoffert does not reduce to a negligible value the fraction of dust that is entrained out of the reactor with the burnt gases at the mouth of the reactor. It is the process of Claims 1 and 14 that produces discharge gases from the reactor having reduced TOC and fly ash that permits discharging the gases to the atmosphere without any post-treatment. Rather, Hoffert discloses that it is essential to use the cyclone apparatus to remove the dust, which is unnecessary with the present invention. In other words, the flue gases of the combustor in Hoffert, before being discharged in the atmosphere, are subjected to the compulsory post-treatment to reduce the TOC and the ash. Only in this way can the Hoffert plant be used in an industrial setting.

Morever, the combustion in the method of the present invention is carried out under isothermal or quasi-isothermal conditions. Quasi-isothermal means that the temperature in the combustion process is very similar to the isothermal conditions. The Examiner asserts that the range of 2100-2800°F in Hoffert corresponds to quasi-isothermal conditions (page 2, paragraph 2 of the Office Action dated November 19, 2009). Hoffert teaches that the hot pressurized gas produced in the primary combustion chamber is usually at a temperature of about 2100°-2800°F and is cooled in the secondary combustion chamber by mixing with a quench gas such as compressed air or steam (col. 8, lines 1-2) to reduce the gas temperature to about 1400°-2000°F (col. 4, lines 20-28). Applicants further note that the range of temperature taught by Hoffert is the temperature that can be used in the combustion reactor and does not define a range for a quasi-isothermal condition in the reactor. 700° F (2800° - 2100 ° F) is not a small temperature range. "Quasi" means essentially constant temperature in the combustor. The Applicants have found that this feature is fundamental for solving the technical

problem of the invention. If this feature is not satisfied, one cannot eliminate the cold zones in the reactor and solve the technical problem as accomplished by the present invention. Hoffert does not teach or suggest that the combustion in the combustor is carried out under conditions of isothermy or quasi-isothermy. Hoffert also fails to teach or suggest wherein the combustion reaction is performed without substantial oxygen deficit, as recited in Claims 1 and 14. Hoffert is totally silent with respect to the feature of an oxygen deficit.

Accordingly, the Applicants respectfully submit that Hoffert fails to teach or suggest the features of Claims 1 and 14, and, in particular, a method and plant for treating waste materials that includes a comburent enriched with oxygen and recycled gases, wherein combustion is carried out under isothermal or quasi isothermal conditions and without substantial oxygen deficit, and wherein gases produced in the combustor can be discharged in the atmosphere without any post-treatment.

The Applicants respectfully submit that Munk does not cure the deficiencies note above with respect to Hoffert. Munk discloses an apparatus to reduce noxious emissions from a burner. Munk states that it is known to recirculate combustion gases for reducing noxious emissions (col. 1, lines 29-36). However, the fraction of the recirculated gas that can be fed back to the burner input is approximately 25%, since at higher percentages problems of flame stability arise (col. 1, lines 49-52). Munk aims to obtain a further reduction of noxious emissions without undue sacrifice of flame stability and/or burner efficiency (col. 1, lines 58-60).

The solution disclosed by Munk is a fogging device, i.e. an apparatus for producing water/steam, which humidifies the recirculated flue gas (see the Abstract).

Munk uses water in the recycled gas in order to decrease the temperature of the flue gas. The Applicants respectfully submit that Munk provides no motivation for one of ordinary skill in the art to conclude that combining aspects of the process described in Munk with the process described in Hoffert would bring about the solution of the technical problem of the present invention.

Munk is directed to reducing NOx that it is formed in the combustor at high temperatures. In order to decrease the temperature of the combustor, Munk recycles the gases coming out of the reactor and decreases their temperature by adding water (see Munk col. 1). Hoffert is directed to a combustion process carried out at high temperatures, which prevents the reduction of NOx according to Munk. For this reason alone, one of ordinary skill in the art would not consider it obvious to combine the teachings of Munk with Hoffert, as the high temperatures of Hoffert would not allow for the reduction of NOx. Furthermore, according to the present invention, high temperature is dislosed as 1500° (C=1773 K=2360° F). Under these conditions, Munk teaches that the NOx cannot be reduced. Therefore, one of ordinary skill in the art would not consider it obvious to combine Munk with Hoffert as asserted by the Office Action. Moreover, Munk also fails to teach or suggest the combination of features of Claims 1 and 14, and, in particular, wherein a method and plant for treating waste materials includes providing a comburent enriched with oxygen and recycled gases, wherein combustion is carried out under isothermal or quasi isothermal conditions and without substantial oxygen deficit, and wherein gases produced in the combustor can be discharged in the atmosphere without any post-treatment. It is not a question of whether the reduction of TOC and of ashes is an added benefit of the present invention,

rather, Hoffert and/or Munk, alone or in combination, fail to disclose the features recited in Claims 1 and 14 that result in the reduction of TOC and ash for solving a recognized problem in the state of the prior art.

Kasin, Staudinger, Rettig, and Heger are cited for teaching various other features and also do not cure the deficiencies noted above with respect to Hoffert and Munk. Accordingly, for at least the reason(s) provided above, the Applicants respectfully submit that Hoffert, Munk, Kasin, Staudinger, Rettig, and Heger, alone or by any combination, do not disclose, teach or suggest, and teach away from certain of, the features of the present invention, as recited by Claims 1 and 14. As such, the Applicants respectfully submit that one of ordinary skill in the art would not find it obvious to modify Hoffert according to the teachings of Munk, Kasin, Staudinger, Rettig, and Heger, alone or in combination, because to do so would not arrive at the invention recited by Claims 1 and 14, respectively. Accordingly, the Applicants submit that Claims 1 and 14 should be deemed allowable over Hoffert, Munk, Kasin, Staudinger, Rettig, and Heger.

Claims 2-4, 6, 7, 10-13, 28 and 29 depend from Claim 1; and Claims 15-18, 21, 22, and 24-27 depend from Claim 14. Accordingly, the Applicants respectfully submit that these dependent claims should be deemed allowable for the same reasons that Claim 1 and 14, respectively, are allowable, as well as for the subject matter recited therein.

Withdrawal of the rejections is respectfully requested.

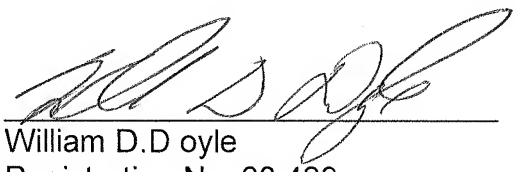
Conclusion

In view of the foregoing, Applicants respectfully request reconsideration of the application, withdrawal of the outstanding rejections, allowance of Claims 1-4, 6, 7, 10-18, 21-22 and 24-29, and the prompt issuance of a Notice of Allowability.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing attorney docket number 108907.00043**.

Respectfully submitted,



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